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## ML project recognized as one of year's most technically innovative products

by Timothy R. Anderl, Materials and Manufacturing Directorate

WRIGHT-PATTERSON AFB, Ohio — A product developed as a result of a contract with the Air Force Research Laboratory was recently recognized as one of the most innovative products of the year.

The product is a Crystal-Scan Laser Beam Multimeter, developed by Beam Corporation of Oviedo, Fla. The technology used to create this product was developed under a Small Business Innovation Research (SBIR) project with Beam Corporation and AFRL's Materials and Manufacturing Directorate (ML).

Each year, Laurin Publishing's *Photonics Spectra* magazine recognizes what they consider to be the 25 most technically innovative products of the year by presenting them the Photonics Circle of Excellence Award. The technology used to create the multimeter, which uses a light-sensitive liquid crystal active material, was developed under the "Photosensitive Liquid Crystals, Next Generation Materials for Dynamic Holography and Electro Optics" project.

For the last 10 years, Dr. Thomas Cooper, a researcher with ML's Survivability and Sensor Materials Division, made strides towards discovering a material whose optical properties would change upon light adaptation. During the project, researchers from the directorate and Beam researched, identified, and developed a sensitive, highly efficient liquid crystal material that allows the manipulation of laser radiation and the characterization of laser beam shapes.

Using this same material, several technology transfer opportunities are possible, which will benefit the military, industry and the medical community. Optical devices such as liquid crystal optical components, all-optical-beam quality meters, optical laser beam power meters, diffractive optical variables, and handheld nonlinear optical devices will all benefit from this technology. "From this SBIR, we've been able to develop a first-rate liquid crystal technology," said Cooper. "What started with in-house basic science has developed into a useful application. This SBIR was imperative to finding useful answers about these next generation materials."

The technology was transferred and used in the Crystal-Scan Laser Beam Multimeter, which uses a 50-micrometer layer of nonlinear optical liquid crystal material, sandwiched between

two pieces of glass. The optical properties of the liquid crystal material make it sensitive to the power density of an incident laser. When this sandwiched liquid crystal "cell" is placed at the focal point of a laser beam, a ring pattern is formed. The ring pattern can be observed visually on an observation



*Beam Corporation's Crystal-Scan  
Laser Beam Multimeter*

screen, or directly through a camera. By comparing the pattern of the beam, both with and without the cell, beam profiles and information about the laser can be calculated by a computer algorithm.

For 14 years, these annual awards have recognized enterprising companies and individuals who have pushed the limits of technology to develop new photonic products and processes. The 25 winning products are chosen by members of *Photonics Spectra's* Editorial Advisory Board, a panel of experts in a variety of technical disciplines, from hundreds of entries submitted from around the world. To be eligible for a 2001 award, the products had to be commercially available between Jun. 1, 2000, and May 31, 2001.

The ceremony honoring the 2001 Photonics Circle of Excellence Award Winners took place Jan. 21, in San Jose, Calif. The ceremony was held concurrently with SPIE's (Society of Photo Optical Instrumentation Engineers) Photonics West, America's largest commercial exhibition of optics, lasers, optoelectronic components, and imaging technologies. @